REMARKS/ARGUMENTS

In response to the Office Action mailed December 1, 2005, Applicants request reconsideration. Claims 2-7 are pending in this patent application.

Claim 6 is allowed.

Claim 7 is an independent claim from which claims 2-5 depend directly or indirectly. The structure described in claim 7 is relatively easy to understand. There are two principal elements: an electrode and a circuit card. The electrode includes at least four elements. The first two recited elements of the electrode are a wiring layer and a substrate. The next element is a plurality of metallic layers, with the metallic layers including at least first and second layers that are sequentially disposed. The outermost layer of the plurality of layers is the first layer, because that layer is the layer most remote from the substrate and is expressly described as having an exposed surface. That first layer contains tin as a principal constituent. The second layer contacts the first layer so that the second layer must be disposed between the first layer and the substrate. The second layer contains a metallic element which produces a eutectic reaction with tin and has a lower melting point than the first layer.

Claim 7 and its dependent claims 2 and 3 were rejected as unpatentable over Parrish et al. (U.S. Patent 6,550,665, hereinafter Parrish) in view of Mertol et al. (U.S. Patent 6,818,996, hereinafter Mertol). This rejection is respectfully traversed.

The explanation of the rejection demonstrates that Parrish does not supply the elements of claim 1 for which it was cited. Thus, even as allegedly modified by Mertol, the invention as defined by claim 7 cannot be produced because all of the elements of the structure of the electrode of claim 7 are not present in any possible combination of Parrish and Mertol.

Based upon the reference numbers appearing in the Office Action, the Examiner is directing attention to Figure 2A of Parrish. That figure shows two substrates, 201 and 203, that might be respectively compared to the electrode and the circuit card of claim 7. Substrate 201 includes a plurality of contact pads 210 on which are disposed a metal layer 215 and identified as a chromium or titanium adhesion layer and a nickel or nitride

diffusion barrier. Bumps 220 are disposed on the adhesion layer 215 and may have any of the compositions listed in Table 1 appearing in columns 5 and 6 of Parrish.

Likewise, the second substrate 203 includes pads 210, the adhesion layers 215 on the pads, and bumps 230 on the adhesion layers. The bumps 230 may have the same composition from Table 1 as the bumps 220. In Applicants' view, the Examiner should be asserting that pads 210 correspond to the wiring layer on a substrate according to claim 7 and that the plurality of metallic layers include, as the first layer, either the bump 220 or the bump 230 and, as the second layer, the adhesion layer 215. Otherwise, there is no exposed surface as required by claim 7.

When that proper comparison of Parrish to claim 7 is made, then it is apparent that neither of the two structures shown in Figure 2A of Parrish can meet the definition of the electrode as in claim 7. For example, the melting point of the first layer 215 is 1,890°C if chromium, 1,800°C if titanium, and 1,455°C if nickel. The melting point of tin is 230°C so that the melting point of the first layer, i.e., the bump 220 or 230, if the principal constituent is tin, is substantially lower than the melting point of the first layer 215, the corresponding element in Parrish. By contrast, claim 7 requires that the melting point of the first layer, corresponding to the bumps 220 or 230 in Parrish, be higher than the melting point of the second layer, the layer 215 in Parrish. On that ground alone, Parrish cannot provide the basis of the rejection as asserted by the Examiner. The modification proposed based upon Mertol does not provide a reversal of the arrangement of the layers with regard to melting points, so that the combination can still not establish *prima facie* obviousness as to claim 7.

While the foregoing paragraphs describe, in Applicants' view, the proper application of Figure 2A of Parrish to claim 7, a different application of that Figure 2A was made in the Office Action. That comparison is clearly incorrect. In that comparison the Examiner compared the bump 220 of Figure 2A of Parrish to the first layer of claim 7 and the bump 230 to the second layer of claim 7. By inspection, it is apparent that those two bumps are not in contact in Figure 2A of Parrish as are the two layers in claim 7. When the two bumps are in contact, an entirely different element, alloy 250, is produced as shown in Figure 2B of Parrish. Further, when the two bumps are in contact, there is no

exposed surface of either bump that could correspond to the exposed surface of the first layer according to claim 7. Even applying this analysis, Parrish cannot supply all of the elements of claim 7 for which Parrish was cited.

The explanation in the Office Action of the comparison made between the elements of claim 7 and Figure 2A of Parrish suggests that the Examiner has actually applied in the rejection a structure not illustrated in Parrish. That structure would be produced in an intermediate step between Figures 2A and 2B of Parrish. In that unillustrated structure, the bumps 220 and 230 would be brought into contact with each other mechanically, before the application of heat to produce the alloy 250 illustrated in Figure 2B of Parrish. However, even this unillustrated structure cannot meet the terms of claim 7 for which Parrish was cited.

In this hypothetical structure the bump 220, according to the Office Action, corresponds to the first layer and the bump 230 corresponds to the second layer. Assuming, for the sake of argument, that the two bumps would have the composition and relative melting points specified in claim 7, the bump 220 would not have, at that time, an exposed surface for joining to a circuit card. Rather bump 220 would be in contact with and between the bump 230 and a layer 215. Further, the bump 220 would not be the layer most remote from a substrate, presumably the substrate 203. Instead, the adhesion or diffusion preventing layer 215, if not the pad 210 attached to the substrate 201, would be the metal layer most remote from the substrate 203. Clearly, in this application of Parrish to claim 7, either pad 210 or adhesion layer 215 could correspond to the first layer of claim 7. Then, Parrish does not meet claim 7 because the layers are not in the same order as in the claim and there is no first layer that is the most remote layer from a substrate and includes an exposed surface.

Of course, claim 7 is in "open" format and does not exclude the presence of elements in addition to the expressly mentioned elements of that claim. However, in the intermediate, unillustrated structure of Parrish, layers 215, pads 210, and substrate 201 are present, so the terms of claim 7 for which Parrish was cited, including the exposed surface, cannot be met. On this additional and alternative ground, the rejection of claim 7 and its dependent claims 2 and 3 is erroneous and should be withdrawn.

Because of the foregoing errors in relying upon Parrish, the rejection of claim 7 and, therefore, the rejection of its dependent claims 2 and 3, is erroneous.

Claims 4 and 5 were rejected as unpatentable over Parrish in view of Mertol and further in view of Homma et al. (U.S. Patent 6,569,752, hereinafter Homma). This rejection is respectfully traversed.

The rejection of claims 4 and 5 is founded upon the soundness of the rejection of claim 7. As just demonstrated, that rejection is erroneous and, therefore, the rejection of claims 4 and 5 is erroneous. Accordingly, the rejection of claims 4 and 5 does not require further discussion.

Reconsideration and allowance of claims 2-5 and 7, in addition to claim 6, are earnestly solicited.

Respectfully submitted,

Jeffrey A. Wyand, Reg. No. 29,458
LEYDIG, VOIT & MAYER
700 Thirteenth Street, N.W., Suite 300
Washington, DC 20005-3960
(202) 737-6770 (telephone)
(202) 737-6776 (facsimile)

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